

Notice of Allowability

Application No.

10/077,094

Examiner

Venkatesh Haliyur

Applicant(s)

HOLCMAN ET AL.

Art Unit

2616

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 09/17/2007.
2. ☒ The allowed claim(s) is/are 5, 12 and 21.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

Allowable Subject Matter

1. The following is an examiner's statement of reasons for allowance:

Claims 5,12,21 are allowed over prior art. Claims 1-4,6-11,22-24 are canceled.

The prior art of record fails to teach and render obvious the limitations as amended in the independent claims 5,12,21.

2. The present invention relates generally to a method of and apparatus for effecting handoff between different cellular communications systems. There are many reasons that a failure in handoff may occur. Handoff can fail if there is no idle channel available in the neighboring cell for communicating the call. Handoff can also fail if another base station reports hearing the mobile station in question, when in fact this base station actually hears a different mobile station using the same channel in a completely different cell. This reporting error will result in the call being switched to a wrong cell, typically one in which signal strength is insufficient to maintain communications. Furthermore, should the mobile station fail to hear the command to switch channels, the handoff will fail. Actual operating experience indicates that handoff failures occur frequently, which questions the reliability of the system.

Another common problem in the conventional telephone system occurs when the

mobile station is near the border between two cells. In this situation the signal level tends to fluctuate at both base stations. This signal level fluctuation results in a "ping-ponging" situation in which repeated requests are made to hand the call back and forth between the two base stations. Such additional unnecessary handoff requests increase the possibility of the mobile station incorrectly hearing the channel switch command or failing to hear the command at all. The use of "soft" handoff techniques has been found to substantially reduce the incidence of ping-ponging situations in which repeated handoff requests are made between a pair of base stations.

Although the foregoing techniques are well suited to call transfers between cells in the same cellular system, a more difficult situation is presented by movement of the mobile station into a cell serviced by a base station from another cellular system. One complicating factor in such "intersystem" handoffs is that the neighboring cellular system often has dissimilar characteristics. For example, adjacent cellular systems will often operate at different frequencies, and may maintain different levels of base station output power or pilot strength. These differences effectively preclude the mobile station from performing the pilot strength comparisons and the like contemplated by existing mobile-assisted soft handoff techniques.

Currently available methods deal with this problem by modifying GSM systems to enable it to effect handoff to a non-GSM system, e.g. a CDMA system. However, GSM has been established for a long time now, relatively speaking, and operators will be reluctant to make expensive modifications to existing equipment in order to accommodate a neighboring incompatible system. If new messages are added to the air interface in support of dual-mode mobile stations, then modifications must be made to support these new messages. Plainly, this is undesirable from the perspective of the operator. Another problem with handing off between a CDMA system and a GSM system is that CDMA and GSM authentication use two different methods and keys. The authentication methods in GSM and CDMA 1X are basically the same, but the keys have different sizes. CDMA 1X has additional procedures such as unique challenge and count methods, which respectively prevent channel hijacking and replay attacks. These and other shortcomings of existing intersystem handoff techniques impair the quality of cellular communications, and may be expected to further degrade performance as competing cellular systems continue to proliferate.

The method, apparatus and system of the instant application advantageously overcome above known problems.

GSM performs encryption at the frame level. Every frame is encrypted using the frame number and the 64-bit Kc key. The frame number and Kc mask is applied

to every frame. In the CDMA 1X system the encryption is performed using a 42-bit private long code.

In the hybrid system the Kc key is used to derive a 42-bit private long code mask, with a mapping algorithm mapping between Kc and the private long code. This mapping is performed in the MSCc, which then simply tells the BSC which private long code to use. The ADDS operation which allows the transfer of transparent services between terrestrial network elements (e.g. MSC, SMS, PDC) and the mobile station. The system uses this operation to transfer the Authentication information RAND to the MS and to transfer SRES back to the MSC. The ADDS messaging operation goes from the MSCc to the BSCc, and allows data to be sent to the mobile station over the paging channel. The ADDS Transfer operation goes from the BSCc to the MSCc and allows data to be sent to the network from the mobile station over the access channel. The ADDS Deliver operation goes from the MSCc to the BSCc, or BSCc to MSCc and allows data to be sent between the mobile station and the network over the traffic channel. An ADDS parameter has been defined as "ADDS User Part", which contains a 6-bit "Data Burst Type" that indicates the format of the application data message. The ADDS operation utilizes the ADDS User Part parameter to contain the service-specific data. The authentication operation makes use of the ADDS User Part to carry the authentication data. The described system uses a

new Data Burst Type named "GSM-MAP Authentication" which is interpreted accordingly by the mobile station.

Therefore the applicant's intersystem handoff technique is capable of reliably directing the handoff of a call or connection between the base stations of different cellular communication systems transparently.

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Venkatesh Haliyur whose telephone number is 571-272-8616. The examiner can normally be reached on Monday thru Friday 8:30AM to 4:30PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edan Orgad can be reached on 571-272-7884. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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4. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Venkatesh Haliyur

Patent Examiner

vh 09/24/07

EDAN . ORGAD
SUPERVISORY PATENT EXAMINER

Edan Orgad 9/31/07